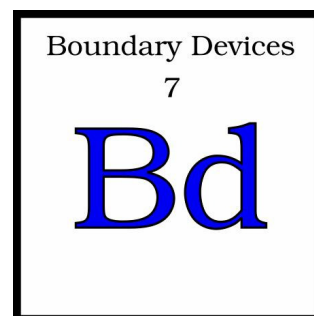


Nitrogen53 Hardware User Manual

Revision History

Date	Revision	Description
03-08-2011	1.0	First Draft
04-04-2011	1.1	Updated Pin Outs
05-24-2011	1.2	Updated Board Layout
06-27-2011	1.3	Updated Pin Outs for Touch screen



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2 Overview

The Nitrogen53 is based on the next generation ARM-Cortex A8 processor from Freescale, the IMX53. With expanded DDR2 memory capacity of up to 1GB at 800MHz and processor speed of 1GHz, the IMX53 is a powerful multimedia platform capable of 1080P video playback. The Nitrogen53 was designed to take advantage of the video performance of the IMX53 by offering multiple display interfaces including HDMI, LVDS, and TTL. With OpenGL® ES 2.0 and OpenVG™ 1.1 hardware accelerators, the IMX53 is ideal for 3D applications.

The hardware specifications for the Nitrogen53 are the following:

- Freescale IMX53 Processor – 1GHZ
- Power Management IC
- 512MB DDR2 400MHz memory (up to 1GB)
- 2MB Serial Flash
- TTL/HDMI/LVDS Display Interface
- 5V DC input voltage standard (12V versions available)
- 2 microSD Card slots
- 1 microUSB OTG
- 3 USB Host Ports
- 4-wire/5-wire Resistive Touch Screen Support
- Microphone In
- Amplified Audio Out/Headphone Jack
- 10/100 Ethernet with POE Support
- Power On/Off + Android Buttons (Menu, Home, Back, Search)
- Interface to 5MP Omnivision 5642 Camera Sensor
- I2C/SDIO Interface available
- 3 RS232 Ports
- SATA Hard Drive
- Battery Backup for RTC
- Component Video Output
- LED Backlight Driver
- General Purpose I/O for Device Control
- WiFi/Bluetooth/GPS/Accelerometer Available via daughter board

3 Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Main Input Voltage	TBD	5	TBD	V
Power Consumption*	-	2.5	TBD	W
CPU Clock	-	1.0	1.0	GHz

*The Power Consumption refers to a single board with no other peripherals plugged in.

4 Connector Details

As shown in Figure 1, the Nitrogen53 board contains a wide variety of I/O options. This section will focus on the details of each connector.

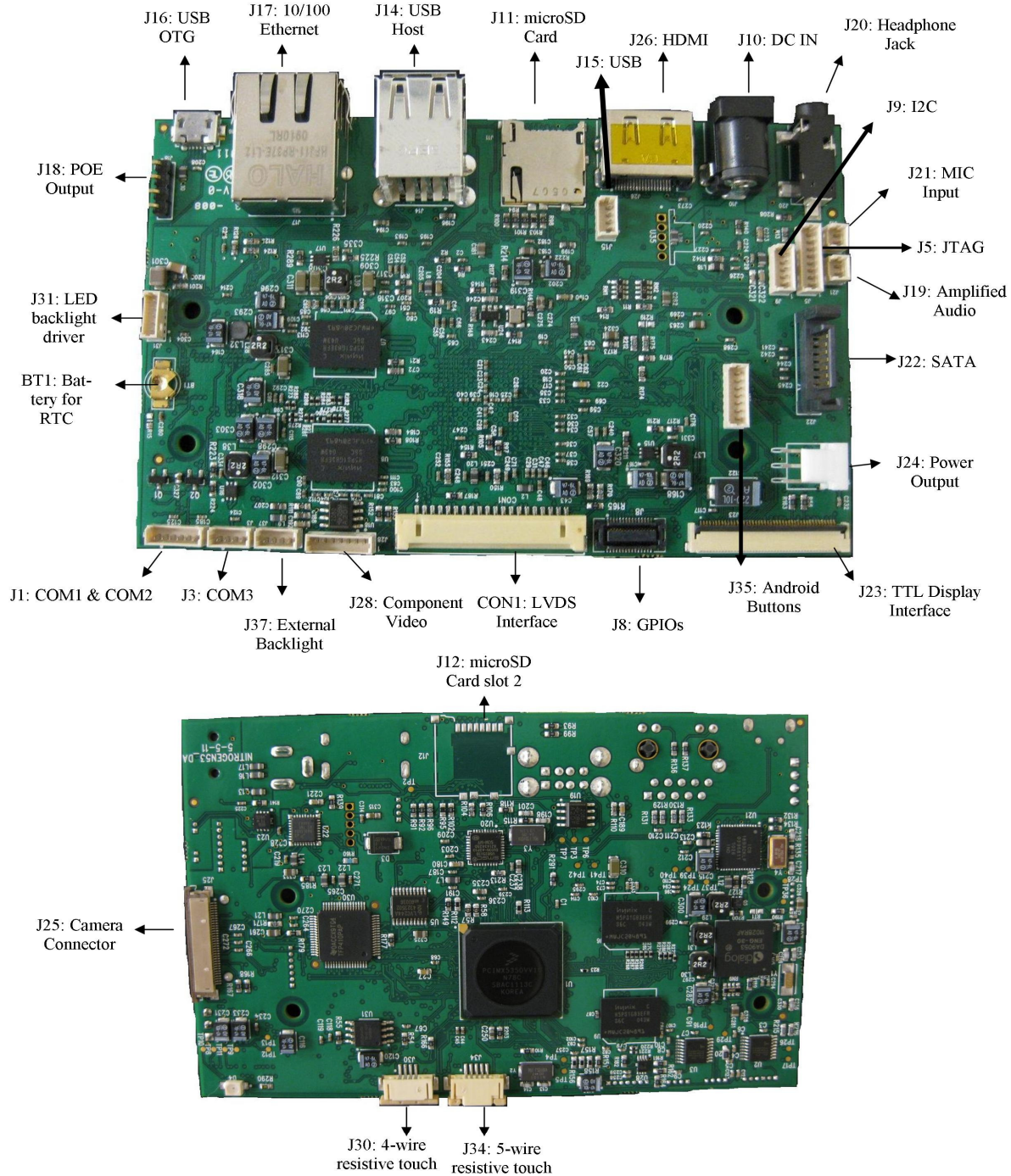


Figure 1: Nitrogen53 board

4.1 Standard Connectors

The list of industry standard connectors with known pin outs is the following:

Ref Designator	Function
J16	USB OTG
J17	10/100 Ethernet
J14	2 x USB Host
J11/J12	microSD Slot
J26	HDMI (DVI Signals)
J10	DC Power Jack
J20	Headphone Jack
J22	SATA

4.2 Custom Connectors

The Nitrogen53 board has a wide variety of peripheral interfaces available via custom connectors.

J1: COM1 & COM2 (Molex 53047-0610)

Pin#	Function
1	UART1 TX
2	+5V
3	GND
4	UART2 TX
5	UART2 RX
6	UART1 RX

J3: COM3 (Molex 53047-0410)

Pin#	Function
1	+5V
2	UART3 TX
3	UART3 RX
4	GND

J5: JTAG (Molex 53047-0810)

Pin#	Function
1	RESET1
2	GND
3	TRST*
4	TDO
5	TDI
6	TCLK
7	TMS
8	GND

J8: General Purpose Input/Output (Molex 54167-0308)

Pin#	Function
1	GND
2	GND
3	EIM_DA0
4	EIM_DA1
5	SD3_CMD
6	SD3_CLK
7	SD3_DATA0
8	SD3_DATA1
9	SD3_DATA2
10	SD3_DATA3
11	GPIO2_24
12	GPIO2_21
13	GPIO2_20
14	GPIO2_19
15	AUD3_TXC
16	AUD3_TXD
17	AUD3_TXFS
18	AUD3_RXD
19	PWM0
20	GPIO5_2
21	GPIO_9
22	GPIO3_23
23	UART3_CTS
24	UART3_RXD
25	UART3_RTS
26	UART3_TXD
27	3.3V
28	3.3V
29	GND
30	GND

J9: I2C (Molex 53047-0510)

Pin#	Function
1	+5V
2	SCL
3	SDA
4	GPIO
5	GND

J15: USB3 (Molex 53047-0410)

Pin#	Function
1	+5V

2	USBDN_DM3
3	USBDN_DP3
4	GND

J18: POE Output (Singatron SSW-1-04-01-T-S)

POE Output is meant to interface with BD POE module. If you need further details, please contact us.

J19: Audio out (Molex 53047-0210)

Pin#	Function
1	VO-
2	VO+

J21: Microphone In (Molex 53047-0210)

Pin#	Function
1	MIC_IN
2	Common

J23: TTL Display Interface (Omron XF2M-4515-1A)

Pin#	Function
1	GND
2	GND
3	3.3V
4	3.3V
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4

26	B5
27	B6
28	B7
29	GND
30	CLK
31	3.3V
32	HSYNC
33	VSYNC
34	RDY
35	3.3V
36	GND
37	NC
38	NC
39	NC
40	NC
41	GND
42	NC
43	NC
44	GPIO
45	PWM

J24: External Power Connector (Tyco 640457-3)

Pin#	Function
1	+5V
2	GND
3	GND

J25: Camera (AVX 6210033340800)

Pin#	Function
1	GND
2	D19
3	D18
4	D17
5	D16
6	D15
7	D14
8	D13
9	D12
10	D11
11	D10
12	D9
13	D8
14	SCL
15	SDA
16	GND

17	CLK
18	GND
19	2.8V
20	1.8V
21	2.8V
22	2.8V
23	GND
24	DATA_EN
25	GND
26	CAM_RESET
27	VSYNC
28	HSYNC
29	GND
30	PIX_CLK
31	GPIO_2
32	GND
33	GPIO_7

J28: Component Video (Molex 53047-0710)

Pin#	Function
1	+5V
2	IOB
3	IOG
4	IOR
5	VGA_HSYNC
6	VGA_VSYNC
7	GND

J30: 4-wire Resistive Touch (Molex 52271-0479)

Pin#	Function
1	X-
2	Y-
3	X+
4	Y+

J31: LED Backlight (Molex 53047-0510)

Pin#	Function
1	LED String 1 Cathode
2	LED String 2 Cathode
3	LED String 3 Cathode
4	LED Anode
5	LED Anode

J34: 5-wire Resistive Touch (Molex 52207-0585)

Pin#	Function
1	X-
2	Y+
3	X+
4	Y-
5	Sense

J35: Android Buttons (Molex 53047-0710)

Pin#	Function
1	GPIO ON/OFF
2	MANUAL ON/OFF
3	HOME
4	SEARCH
5	BACK
6	MENU
7	GND

J37: Auxiliary Power (Molex 53047-0410)

Pin#	Function
1	Tracks DC INPUT voltage
2	NC
3	PWM0
4	GND

CON1: LVDS (Hirose DF14-20P-1.25H)

Pin#	Function
1	3.3V
2	3.3V
3	GND
4	GND
5	TX0_N
6	TX0_P
7	GND
8	TX1_N
9	TX1_P
10	GND
11	TX2_N
12	TX2_P
13	GND
14	CLK_N
15	CLK_P
16	GND
17	TX3_N

18	TX3_P
19	GND
20	GND

5 Mounting

The overall dimensions of the Nitrogen53 board are 116x75mm.

